opolitan Transportation Authority
Metro Gateway Cities
7878 Telegraph Road
Downey, CA 90240-2137
562.658.0200 Tel
562.658.0211 Fax
metro.net

GATEWAY CITIES GOVERNANCE COUNCIL
NOVEMBER 10, 2004

SUBJECT: TRANSIT BUS BULBS

ACTION: RECEIVE AND FILE

BACKGROUND

Earlier this year the Gateway Cities Governance Council directed staff to investigate the concept of transit bus bulbs and their potential application along transit corridors serving the Gateway Cities Service Sector. The following sections of this report discuss the concept in more detail, provides examples where bus bulbs have been implemented in other major cities, highlights their advantages and disadvantages, and identifies cities within the Gateway Cities areas where bus bulbs are either under consideration, planned or currently in place.

DISCUSSION

Definition

A bus bulb is generally defined as a section of sidewalk that extends from the curb of a parking lane to the edge of a through traffic lane. The bus bulb, as it is commonly known, is sometimes referred to as a curb extension, a nub or a bus bulge. The extension of the curb into a parking lane creates an additional space for pedestrians to walk and for passengers to wait for a bus. The bulb can also provide additional space for bus passenger amenities such as shelters, benches and landscaping to name a few. Attachment A shows a typical design for a bus bulb.

A bus bulb is very different from a conventional bus stop in that passenger boarding and alighting activity takes place in the street area now used for parking. This concept is unlike a regular bus stop where passengers board and alight the bus from the curb next to the parking lane. Bus bulbs are normally constructed in well-developed, mixed-use downtown or urban settings. The location of these bulbs can be nearside on some streets, farside on others or mid-block in some cases. Attachment B compares the design concept of a conventional bus stop with that of a bus bulb.

Regional Experiments

Several cities in the United States and Canada have implemented or demonstrated an interest in using bus bulbs to improve pedestrian and vehicular traffic along congested corridors in their communities. San Francisco, for example, has been testing pilot programs since the early 1970's and has considerable experience with them. Others cities like Portland and Seattle started bus bulb programs in the early 1990's.

The following cities were involved in early experiments with bus bulbs: Charlotte, North Carolina; Grand Rapids, Michigan; West Palm Beach, Florida; Portland, Oregon; San Francisco, California; Seattle, Washington; and Vancouver, British Columbia.

Guidelines For Bus Bulbs

Over the past 30 years or so a considerable amount of research has been conducted by a growing number of city planners and transit planners on the effectiveness of bus bulbs. During this time a wide range of data has been collected, analyzed and conclusions reached. Listed below are some general guidelines that have been developed from this research that help determine where bus bulbs work and where they don't.

Conditions that support the success of bus bulbs include the following:

- Communities where transit is given high priority;
- High levels of pedestrian activity on the sidewalk;
- High levels of bus patronage at the bus stop or within the corridor;
- Lower operating speeds on the roadway;
- Support from local business owners; and
- Streets with two travel lanes in each direction.

Conditions Where Bus Bulbs Don't Work:

- High speed corridors (e.g. 40-45 mph);
- Very high traffic volumes;
- Single Lane Streets;
- High number of disabled boarding and alighting;
- Areas where 24 hour curbside parking is not available;
- Low transit ridership areas;
- Low pedestrian areas; and
- Layover locations

Case Study

A good example of the effectiveness of bus bulbs was documented in California in 1999 when the city of San Francisco implemented a number of them along South Mission Street. At that time nine regular bus stops on Mission Street between Cesar Chavez Street and Santa Marina Street were converted to bus bulbs. An analysis was subsequently conducted of the impact this change had on pedestrian and transit patrons, and on vehicle traffic (auto and bus) along this corridor. Discussed below are key findings that resulted from the Mission Street Project. Attachment C shows the affected corridor and stop locations where bus bulbs were constructed.

Pedestrian Impact

Bus bulbs reduced pedestrian congestion at the bus stops and adjacent walkways by expanding the amount of space where people could walk, stand and sit. Passing pedestrians had greater physical separation from transit riders waiting for their bus. The expanded sidewalk area reduced crowding, increased walk speeds for by-passers, and improved social space near those locations.

The bus bulb also served to lessen the distance passing pedestrians must walk to cross the street since the bulb extends out into the traffic lane, reducing the overall width of the street by 6 to 7 feet. The shorter walk distance (e.g. crosswalk) reduced pedestrian exposure to vehicular traffic while crossing. It was felt this was especially significant for older persons and others with mobility impairments. Attachment D illustrates the corner of Mission and 30th St prior to the construction of a bus bulb and after one was installed.

Bus Rider Impact
The bulbs provided more room for transit users to board and alight the bus compared to conventional bus stops where crowding and bunching was quite common due to limited space and high passenger activity. Quicker loading and unloading of passengers resulted, reducing dwell time at the stops.

Additionally, the added space enabled passenger amenities to be constructed at bus stop locations where none existed before. These amenities included passenger shelters, benches, security lighting and landscaping, all designed to increase the safety and comfort of transit riders.

Transit Operation Impact
Before and after results showed a 7-8 percent increase in bus speed in the block and in the corridor where bus bulbs were constructed. This increase was realized by eliminating the need for the bus to weave in and out of the traffic lane, as was required previously in order to serve the conventional bus stop. All passenger boarding and alighting activity is now conducted at the bus bulb while the bus is stopped in the traffic lane.

Business Impact
The creation of more open space at congested bus stops generally had a positive impact on businesses adjacent to those stops. Businesses had improved visibility because pedestrian congestion was reduced and/or eliminated near storefronts.

In addition, automobile parking was increased in several cases because less curb space was required for transit purposes under the bus bulb design than was previously needed. For example, where 90-100 feet of parallel curb space may have been required for a conventional bus stop, only 50 feet was required under the bulb design. Hence, the unused curb space was converted to provide more on-street parking, thus benefiting local businesses.

Auto Traffic Impact
The impact of bus bulbs on auto traffic was mixed compared to other findings. For example, an increase in auto queuing was observed near the bus bulbs compared to previous auto circulation along the corridor. However, despite the increased incidents of auto queuing, it was noted the actual duration was observed to be shorter than before the bulbs were implemented.

The number of auto lane changes also increased along the corridor where the bus bulbs were implemented compared to previous data. Lane changes were more prevalent at nearside bus bulbs. By comparison, no significant difference in the number of lane changes were observed at farside stop locations for either the standard bus bay design or the bus bulb design.

Finally, other results showed that automobile speeds increased from 17 to 45 percent along bulb treated corridor, depending upon the time of day. This increase was thought to be the direct result of improved bus operations in the corridor since the buses were no longer required to weave in and out of the traffic lanes to board and alight passengers at the curb.

Bus Bulbs In Gateway Cities Sector Area

Staff has surveyed the cities in the Gateway Cities Sector to determine whether any have implemented or plan to implement bus bulbs within their jurisdictions. Most said they had no previous experience with them, others were unaware of the concept. Only Huntington Park, South Gate and Long Beach were found to have active programs.

The city of Huntington Park established six mid-block bus bulbs along Pacific Ave a number of years ago. Two more bus bulbs were added along this corridor within the last two years. At this time they have no plans to expand the number of bulbs on this or any other corridor in the city. It is noteworthy to mention they are pleased with the bulb project and cite a number of improvements like those noted for the Mission Street Project in San Francisco.

The city of Long Beach plans to implement a bus bulb project next year. They are currently assessing candidate corridors and preparing final plans. The corridors proposed to receive this treatment include portions of Anaheim Street, Broadway and Third.

CONCLUSION

Several cities across the United States and Canada have conducted various pilot programs over the past 30 years to test the effectiveness of bus bulbs on pedestrian and vehicle traffic in their communities. Over this time general guidelines on bus bulb placement have been developed to aid cities in decision-making. These guidelines serve to determine the advantage, or disadvantage, of bulb placement. A recent test conducted in the city of San Francisco demonstrated the effectiveness of bus bulbs along a major corridor in that city. While research on bus bulbs continues, few cities within the Gateway Cities Service Sector have implemented or plan to implement bus bulbs at this time.

NEXT STEPS

Staff proposes to continue discussions with cities in our sector about the bus bulb concept. We also plan to identify possible locations in the Gateway Cities region that bus bulbs may be beneficial. It is our intention to share information with cities in our sector area that will demonstrate how a well-planned bus bulb project can benefit cities, transit operators and the public alike.

Prepared by: Alex Clifford, General Manager, Gateway Cities Sector
Dan Nguyen, Service Development Manager
Michael Sieckert, Planning Manager

Attachment A: Bus Bulb Layout
Attachment B: Comparison of Bus Bay Designs
Attachment C: Mission Street Corridor
Attachment D: Before and After Comparison of Bus Bulb